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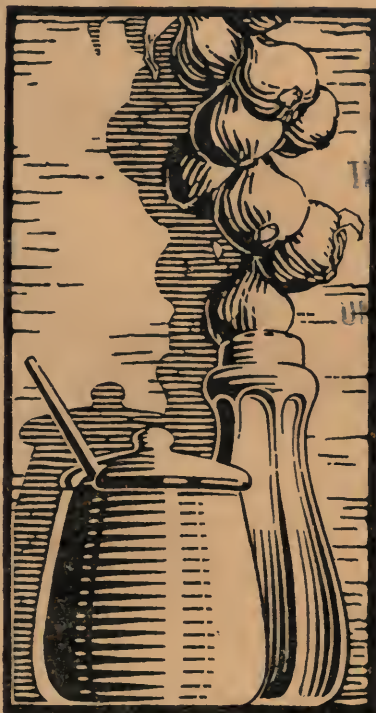
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SPICES AND CONDIMENTS

BY
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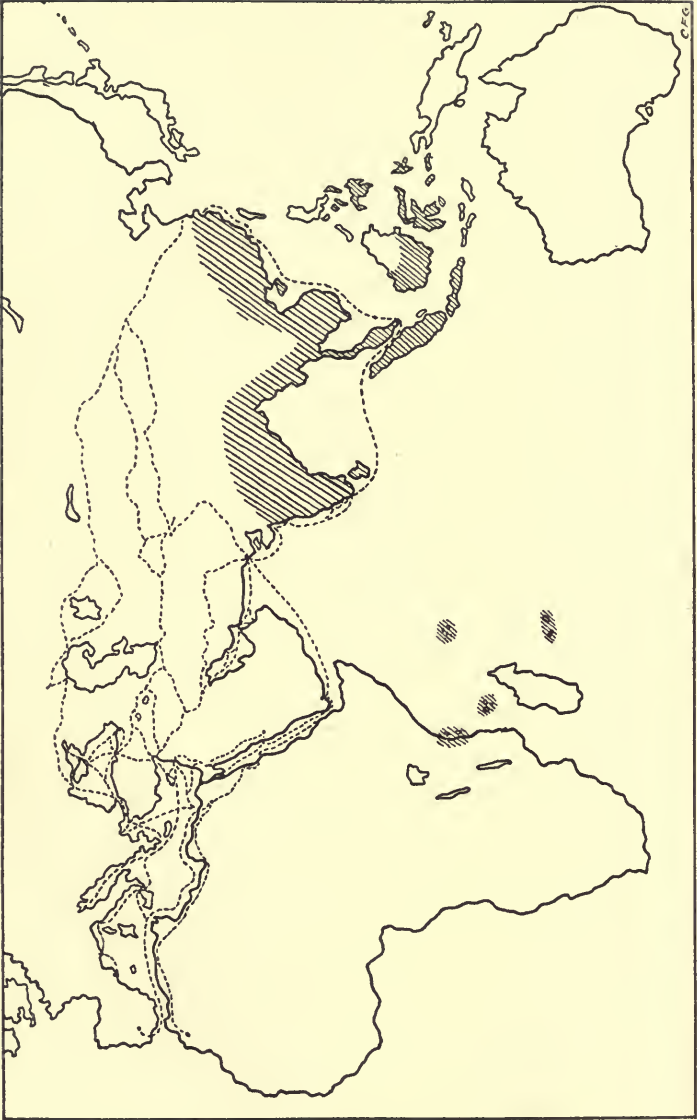
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STEPHEN C. SIMMS, DIRECTOR

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FIELD MUSEUM OF NATURAL HISTORY

DEPARTMENT OF BOTANY

CHICAGO, 1930

LEAFLET NUMBER 15

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Spices and Condiments

There is probably no more romantic chapter in the history of vegetable products than that of the discovery of spices and condiments. In all parts of the world from the earliest known times, spices have been almost as eagerly sought as gold. The discoveries of new land, the determination of shorter trade routes, and the colonization of producing countries have resulted from the pursuit of drugs and spices. It was this search which led to the first rounding of the Cape of Good Hope, the colonization of the East Indies, and the discovery of America. The Straits Settlements colony was the result of Portuguese, Dutch and English competition for the eastern spice trade. The development of European trade and European influence in southern India was due to the pepper gardens; in Mauritius and the Seychelles it was caused by vanilla; and in Ceylon it was started by cinnamon and cardamom exports.

Most of the spices used by man have had their home in the tropics of Asia; the rest of the globe has produced comparatively few.

From Asia have come black pepper, cardamom, cinnamon, nutmeg, and mace; from the Malay Archipelago cloves, clove bark, turmeric, ginger, and greater galangal; and from China cassia bark and lesser galangal. Africa has given grains of paradise, while America has contributed vanilla, red pepper, and allspice. From the cool climates of northern Europe and Asia have come a few,

such as coriander, cumin, caraway, mustard, and calamus root. Often the knowledge of the original home of economic plants cultivated by man for many centuries has been lost. This is likewise true of many of the tropical spices from eastern Asia.

Spices can be classified according to the parts of the plant from which the commercial products are taken.

Cloves and capers are dried flower buds; nutmeg, vanilla, red pepper, black pepper, and allspice are fruits; ginger and turmeric are underground stems; cumin and cassia are barks.

From the point of view of their properties they may be arranged in three groups: stimulating condiments—mustard, horse-radish, garlic, shallot, red pepper, black pepper, and turmeric; aromatic spices—cloves, cinnamon, cassia, cardamom, ginger, mace, nutmeg, caraway, anise, cumin, etc.; and sweet herbs—thyme, mint, sage, basil, marjoram, savory, fennel, parsley, etc.

All aromatic vegetable products which are used in flavoring foods and drinks are included under the name of spice. Almost all have other uses, also, for which they are in commercial demand. Quite a number are useful in perfumery and soap-making, such as vanilla and cloves. Some are used in making incense, e.g., cinnamon; others are useful in medicines, either for flavoring or therapeutic value, as cardamom, ginger, nutmeg, etc. Turmeric is used as a dye, oil of cloves is used to clear sections in microscopy, and other spices are used in several arts. The commercial demand is increased by these additional uses, which tend to stabilize the price.

In the Middle Ages, from the twelfth century on, the use of spices was large in every family. In recent years the use of spice for flavoring food has decreased. Artificial flavorings also have altered the demand, but nevertheless a profitable commerce exists even if it is

not as large as in the days when, next to gold, spices were considered most worth the risk of life and money. The trade is still extensive in Europe and the oriental demand is as large as ever. The value of all spices shipped directly to the United States averages about twelve million dollars annually.

In France the ethereal flavor of such plants as fennel, basil, and balm is sought. In Germany and England preference is given to more pronounced flavors, such as dill, sage, and mint, while the kinds most commonly employed in America are parsley, sage, thyme, marjoram, savory, etc.

The spices and condiments of southern Asia and the adjoining islands that constituted the first objects of commerce between the East and West have played an important role in the trade of all ages. They have kept their original value in spite of all changes in the history of the world. The same spicy cinnamon, cloves, nutmeg, cardamom, pepper, and ginger have been highly appreciated since antiquity, and still thrive in primitive freshness and profusion as they did thousands of years ago in the sunny countries and islands of the Orient.

ALLSPICE

Allspice is the dried unripe fruit of a beautiful evergreen tree (*Pimenta officinalis* Lindl.) of the myrtle family (Myrtaceae), and of the same family as the clove tree. The fruit is picked while unripe because it loses its spicy flavor when fully ripe. The ripe berries have a soft pulp but are almost without odor, hence without value as a spice.

The name allspice was given it from a resemblance in odor and taste to a mixture of cinnamon, cloves, and nutmeg. It is known also as pimento and Jamaica pepper. The word pimento is derived from *pimienta*, the Spanish word for peppercorns, which the spice resembles in shape.

Growers of allspice distinguish between fruitful, or bearing trees, and unfruitful, or so-called "male" trees. The pimento is not a unisexual plant like the nutmeg. Being allied to the clove, it has much the same structure of the flower. It is not likely, therefore, that the flowers are actually male and female respectively, but the so-called male flowers have some defect in the pistil which prevents their fertilization. Plants in the Singapore Botanic Gardens, though flowering freely, never set a single fruit on account of some such defect.

The allspice tree is a native of the West Indies, on the islands of Cuba, Haiti, Trinidad, and Santo Domingo, and more or less in most of the islands of the Caribbean Sea, but it is most abundant in Jamaica, which produces the greater part of the commercial spice. The tree occurs also in Mexico, Central America, and Venezuela, but does not appear to have been cultivated successfully elsewhere. The saplings of pimento are highly valued as walking sticks and for umbrella sticks. At one time these canes were exported in such large quantities from Jamaica as to threaten the existence of the spice industry.

Composition.—The fruit yields a yellow or brownish-yellow oil containing eugenol, with practically the same qualities as clove oil. The berries contain 3 to 4.5 per cent of the oil. Most of the oil is in the pericarp but the seeds also are aromatic.

History.—It seems first to have been imported into Europe about 1601, or a little later, and according to Parkinson substituted for round cardamoms. Ray, in his *Historia plantarum* (1693), distinguished it as a Jamaica spice under the name of "sweet-scented Jamaica pepper" or "allspice."

Use.—Allspice is used chiefly for flavoring confectionery, pickles, and other such foods.

ANGELICA

Angelica (*Archangelica officinalis* Hoffm.) is a biennial or perennial herb of the carrot family (Umbelliferae). The plant is said to be a native of Syria, but has now spread to many cold European climates, especially to Lapland and the Alps, where it has become naturalized. The odd flavor and odor of angelica are due to a volatile oil which is contained in many parts of the plant.

History.—It appears to have been used first as a spice during the fifteenth century. Its use for the preparation of distilled angelica water was described in 1500.

Use.—The roots, young stems, leaf stalks, and midribs or leaves are steeped in syrups of increasing strength to make candied angelica, and the seeds are used for the flavoring of beverages, cakes, and candies. The oil distilled from the seed is used for flavoring.

ANISE

Anise seeds are from *Pimpinella Anisum* L., an annual herb of the carrot family (Umbelliferae). The anise plant came originally from the Orient. It has been introduced throughout the Mediterranean region and into Germany and other temperate regions of both hemispheres. The European market is supplied by Russia, Germany, Scandinavia, Bohemia, Moravia, France, the Netherlands, and Spain. It is grown extensively also in India.

History.—Anise seed is mentioned in the Bible (Matt. 23:23) and by Dioscorides, Theophrastus and Pliny. In the ninth century Charlemagne commanded that it be grown upon the imperial farms. In the thirteenth century Albertus Magnus spoke highly of it. Anise oil is first mentioned in medical books in the *Pharmacopoea Augustana* of 1580.

Composition.—The typical odor of anise seed is due to its volatile oil. The taste is intensely sweet. The

volatile oil consists of 80–90 per cent of anethol (p-methoxypropenylbenzene, $C_3H_5.C_6H_4[OCH_3]$), and methylchavicol and terpenes.

Use.—Seeds of anise are used to flavor curry powder, cake, pastry, and confectionery, and some kinds of cheese and bread. The oil is employed to flavor beverages, to disguise unpleasant flavors of various drugs, and to perfume soaps and other toilet articles.

BALM

Balm (*Melissa officinalis* L.) is a perennial herb of the mint family (Labiatae) which is considered to be a native of southern Europe. It has been introduced into nearly all the temperate climates of the world. Its popular name is a contraction of the word “balsam,” the plant having been used formerly as a specific remedy for a host of ailments. The generic name, *Melissa*, is the Greek word for “bee,” and is an allusion to the fondness of bees for the abundant nectar of the flowers. This undoubtedly has resulted in one of the common names for the plant, bee balm. It is of interest to note that balm seeds are very small; more than fifty thousand are required to weigh an ounce.

History.—Balm has been cultivated as a source of honey and as a sweet herb for more than two thousand years in the southern part of Europe and during the Middle Ages in Germany and Scandinavia. It was cultivated by the Greeks and Romans as well as by the Arabs. It is frequently mentioned in German and Latin poetry and prose.

Use.—The foliage of balm is employed to flavor soups, stews, sauces, and dressing. The fresh leaves are used to some extent in salads. The oil of balm has a lemon-like odor which is characteristic also of the leaves and is used to flavor various beverages.

BASIL

Basil (*Ocimum Basilicum* L.) is an annual herb of the mint family (Labiatae) and is said to be a native of India and Africa. It is now cultivated in England and Europe as an aromatic plant for seasoning. The popular name signifies "royal" or "kingly." In France it is known as the *herbe royale*.

History.—For centuries basil has been esteemed as a condiment in India. During the reigns of Mary and Elizabeth in England farmers grew basil in pots and presented them with compliments to their landladies, when visits were made.

Composition.—Like the other spices of the mint family, basil owes its characteristic properties to a volatile oil. This oil contains pinene, cineol, camphor, and methylchavicol.

Use.—The leaves of basil are used to flavor stews and dressings. It is one of the most popular herbs in the French cuisine and is especially relished in mock turtle soup, which when properly made derives its peculiar taste chiefly from the clove-like flavor of basil. The original and famous Fetter Lane sausages, formerly popular with cockney epicures, owe their reputation chiefly to basil. The golden-yellow essential oil from the leaves is utilized in perfumery and in the preparation of chartreuse and similar liquors.

SWEET BAY

The sweet bay (*Laurus nobilis* L.) is a small tree of the laurel family, a native of the Mediterranean region. It is well known to most of us, as the most universal of evergreen tub plants, and it is of the same family as cinnamon and sassafras. It is considered by some as indigenous to Asia Minor, Syria, and the Silician Taurus, and has been extensively cultivated in shrubberies and sheltered gardens in Europe.

History.—This plant is the laurel of history and poetry. During classical antiquity it acquired great significance as a symbol of victory, but apparently was used in no other way at that time than as a decorative plant. By Dioscorides, Palladius, and Pliny it is mentioned among anointing and medicinal substances.

Composition.—The leaves yield a fixed oil and an essential oil. The essential oil contains principally myrcene (a terpene), eugenol, chavicol, citral, and phellandrene.

Use.—Although the Germans and Russians esteemed the sweet bay only for decorative purposes, during the Middle Ages the plant was an ingredient of medicines. At the present time it is used mostly for non-medicinal purposes. The agreeable odor of bay leaves, with the bitter aromatic taste, has found use as a flavor for various culinary products.

BORAGE

Borage (*Borago officinalis* L.) is a coarse annual herb of the family Boraginaceae. Its popular name is supposed to have come from *burrage*, "rough," Low Latin *borra*, and relates it indirectly to *birrus*, a thick coarse woolen cloth worn by the poor during the thirteenth century. The roughness of the full-grown leaves suggests flannel.

The plant originally came from Aleppo, but for centuries it was considered a native of Mediterranean Europe and Africa. It has become naturalized throughout the world by the Europeans, grows very easily, and disputes possession with many weeds.

History.—According to Ainslie, it was among the plants listed by Peter Martyr as planted on Isabella Island by the companions of Columbus.

Use.—The use of the plant in medicine is now obsolete, and its principal use is for flavoring. It is valued as a flavor in an English drink called "cool tankard," which

is made of wine, water, lemon juice, sugar, and borage flowers. Often it is used similarly in lemonade, negus, claret cup, and fruit juice drinks.

CALAMUS ROOT OR SWEET FLAG

Sweet flag is the rootstock of calamus (*Acorus Calamus* L.), a member of the arum family, a native of northern Asia from the Black Sea to China and also of Japan and North America. It is found likewise in Europe as far north as Scotland and northern Russia, India, Burma, Ceylon, and the Malay region, but probably was introduced into these places. At present most of the drug is brought from southern Russia through Germany to the London market, although occasionally a little comes from India. The rhizome of calamus owes its aromatic agreeable scent and bitter pungent taste to a volatile oil. The oil of sweet flag is found in oil cells in the outer part of the rhizome, so that peeling before using should be avoided. The yield of oil is about 1.3 per cent.

History.—If the calamus of the Bible is the sweet flag, mentions of it in Exod. 30:23, Canticles 4:14, and Ezek. 27:19, are the earliest records of its use. However, there is some doubt as to what was meant in these passages. Dioscorides lists it and it is described by Pliny in the years A.D. 23 to 79.

Use.—Although in the Indo-Malay region it is valued chiefly as a drug, it is used to a slight extent to flavor beer, cordials, and other drinks, and therefore may be classed as a spice.

CAPERS

Capers are the flower buds of the caper bush (*Capparis spinosa* L.) of the caper family (Capparidaceae), which grows abundantly in the southern part of Europe, along the shores and on the islands of the Mediterranean and in Syria. The plant is found wild about Rome, Vienna, and



CAPER

Florence. It is cultivated in France, Spain, Italy, and Majorca, where capers are of commercial value. The greatest supply comes from Sicily, but those of Provence have the highest reputation for their flavor and keeping qualities. Fresh buds are gathered every morning before they expand and are pickled in strong white vinegar and salt. The smallest, greenest buds have the finest quality. Capers are used as a pickle and sauce. The flavor is due to capric acid, $\text{CH}_3(\text{CH}_2)_5\text{COOH}$.

CARAWAY

Caraway (*Carum Carvi* L.) is a biennial or annual herb of the carrot family (Umbelliferae). Both its botanical and popular names are supposed to have been derived from Caria in Asia Minor, where the plant is believed first to have attracted attention. The seeds are exported from Morocco, Russia, Prussia, and Holland. Where caraway is cultivated, it is frequently sown with coriander. The coriander matures more quickly and is harvested before the caraway produces a flowering stem.

History.—Caraway seed was found by O'Heer in the debris of Swiss Lake dwellings, and because of this the plant has been considered a native of Europe. The careum of Pliny is considered to be the same plant. In the twelfth and thirteenth centuries it was grown in Morocco by the Arabs. From Asia it was spread by Phoenician commerce to western Europe. Distilled oil of caraway is first mentioned in the price ordinance of Berlin for 1574.

The plant is now widely distributed and is found in Iceland, Scandinavia, the mountains of Spain, the Himalayas of Hindostan, the veldt of South Africa, the bush of Australia, and prairies and pampas of America. However, it is cultivated mostly in Europe and Asia.

Composition.—Caraway seeds have a hot and acrid but pleasant taste due to an essential oil consisting of

carvol ($C_{10}H_{14}O$) a ketone 50 to 60 per cent, and the terpene d-limonene or carvene.

Use.—Caraway seeds are used in bread, cheese, liquors, salads, sauces, soups, and candy, and especially in seed cakes, cookies, and other foods. The volatile oil from the fruit is employed for toilet articles such as perfumes and soap.

CARDAMOM

There are several plants of the Zingiberaceae or ginger family which produce spices known as cardamom. The most important of these plants is *Elettaria Cardamomum* Maton, which supplies the greater part of the cardamom of commerce and is apparently the only one cultivated. This is a strictly herbaceous, tropical plant. Practically all the cardamoms of commerce are grown in India and Ceylon, for, although the plant has been introduced into most tropical countries, no extensive cultivation has resulted. In Ceylon cardamoms have been one of the most important crops for many years. The light, bright color of good cardamoms is obtained by bleaching. One of the bleaching processes used in Ceylon consists of sprinkling the capsules with water and immediately exposing them to the full sunlight.

History.—There were spices known to the Greeks and Romans as *cardamomum* and *amomum*, but it is not certain that these plants were the present-day cardamoms, although the name of this spice as we know it evidently is taken from these words. Cardamoms were known to Indian and Arabic writers in very early times and are mentioned in the list of spices liable to duty at Alexandria in A.D. 176–180. The Portuguese were the first to pay attention to them as an article of trade in Ceylon in the sixteenth century, and the Dutch government helped the industry in every way during its occupation of the island, but it was not until after the failure of coffee in Ceylon

in 1878 that the industry was developed to its greatest extent.

Composition.—The seeds contain 4–5 per cent of a volatile oil with a penetrating but agreeable odor and a burning camphor-like taste.

Use.—This spice is used in curry powder and for flavoring cakes, especially in Russia, Sweden, Norway, and parts of Germany. It is also utilized in the manufacture of liquors.

CASSIA

There are several barks of an aromatic nature known in commerce as cassia bark or *Cassia lignea*. All of them belong to one or more species of *Cinnamomum*, and are found wild in the eastern Asiatic Archipelago and China. The species found in the Malay Archipelago are wild trees, while those in China are cultivated. *Cinnamomum Cassia* Bl., which is planted, is a large evergreen tree attaining a height of fifty feet and a circumference of five feet. The Chinese territory in which it is grown is comparatively limited—the provinces of Kwang-si and Kwang-tung, a district lying between 110° and 112° east longitude. It is bounded on the north by Si-Kiang, or West River, and extends to the south as far as 23° 3' north latitude. The bark is sent down the Si-Kiang, the natural water route, to Canton.

History.—Cassia has been known from early times as a spice, and it is mentioned frequently in the Bible. Many Greek authors wrote of it, and it is described in Chinese herbals as early as 2700 B.C. Cassia was known to western Europe as early as the seventh century, and is mentioned in medical books written in England before 1066. The exact place of origin of the Chinese bark was unknown to Europe until 1882.

Use.—Good cassia bark has the flavor of cinnamon and is as sweet and aromatic, though often described as



CASSIA

less fine and delicate in flavor. It sells at a lower price than cinnamon and is used chiefly as a substitute for it. The principal constituent of cassia bark is cassia oil. The oil is found not only in the bark but also in the flowers, peduncles, branches, and leaves. This oil contains 73 to 90 per cent of cinnamic aldehyde.

CASSIA BUDS

Cassia buds are the dried unripe fruit of the Chinese cassia tree (*Cinnamomum Cassia* Bl.) of the laurel family (Lauraceae). After flowering, the sepal of the flower swells and forms a cup in which the small, black, olive-like fruit sits like an acorn in its cup. In appearance cassia buds resemble cloves, but are smaller. The cloves are flower buds, while the cassia buds are not. Cassia buds have an odor and flavor similar to cinnamon. They are gathered when about one-fourth their maximum size. The tree is apparently a native of southern China, and the product is exported from Canton, China, and southern India.

Use.—Cassia buds are used as a spice, chiefly in confectionery in place of cinnamon. They are popular among the oriental nations, and the Germans and Russians prefer cassia to cinnamon for flavoring chocolate because it is stronger in taste.

CATMINT OR CATNIP

Catmint or catnip (*Nepeta Cataria* L.) is an erect, branching, perennial herb about three feet high which belongs to the mint family (Labiatae) and is considered a native of Europe and the Orient. Catmint is a well-known weed naturalized in America and frequently found in dry waste places, especially in the East. The popular name of the plant is in allusion to the attraction the plant has for cats. They not only eat it but rub themselves

upon it, purring with delight. The generic name is derived from the Etrurian city Nepic, in the neighborhood of which various species of the plant formerly became well known.

Use.—The greatest value of the plant is for bee forage. As a condiment the leaves were formerly in popular use, especially in sauces. Milder flavors are now more highly esteemed but the French still use it to a slight extent.

CHERVIL

Chervil (*Anthriscus Cerefolium* Hoffm.) is a small annual herb of the carrot family (Umbelliferae), a native to the Caucasus, southern Russia, and western Asia. Its highly aromatic leaves are used by the French and English for seasoning and for mixed salads. They are rarely employed alone but serve as the chief ingredient in what the French call *fines herbes*, a mixture which finds its way into a great many culinary concoctions.

CHIVES

Chives (*Allium Schoenoprasum* L.) are bulbous onion-like perennials of the lily family (Liliaceae). They are native to Europe and Asia and are commonly grown in those continents and to a certain extent in America. The odor and taste resemble those of onions, and the leaves are frequently used instead of onions for flavoring salads, stews, and other dishes.

CINNAMON

The cinnamon of commerce is the bark of an evergreen tree (*Cinnamomum zeylanicum* Nees) of the laurel family (Lauraceae). The tree is a native of Ceylon, and is grown also in southern India, Burma, and the Malay Peninsula. The tree when full grown is about twenty feet high, although it may grow as high as forty feet. Cinnamon

is said to be grown to a small extent in French Guiana, Brazil, and Jamaica, and attempts have been made to cultivate the plant in many parts of the world, with but little success. Ceylon still holds the cinnamon market. The tree is common in Ceylon, especially between 1,000 and 2,500 feet above the sea, occasionally at 7,000 feet. At the highest altitude the leaves have a typical clove odor, but the bark has very little true cinnamon taste. Cinnamon bark is collected, cut, and peeled after the first rains of the season, when the sap begins to circulate between the wood and the bark. The bark of young shoots has very little flavor, and the best bark comes from shoots two years old and from the middle of these shoots. The shoots exposed to the sun during growth are more acrid and spicy than those grown in the shade.

History.—Cinnamon is among the oldest spices known, and the history of its use as a drug is very interesting. In the early writings it was confused with cassia. Both cinnamon and cassia were valued in Biblical times and often mentioned in the Old and New Testaments. In 1505 the Portuguese sailed around the Cape of Good Hope and discovered Ceylon. Before this time cinnamon reached Europe through the old caravan routes across the eastern Mediterranean region. In 1536 the Portuguese occupied the island of Ceylon for the sake of the cinnamon, but after 1656 the Dutch took Ceylon from the Portuguese and monopolized its spice production. In 1796 the English took Ceylon from the Dutch, and the East India Company possessed the monopoly of cinnamon until 1833. In 1825 the plant was introduced into Java by the Dutch. Oil of cinnamon is included in the list of drugs in the first edition of the *Dispensatorium Noricum*, published in 1546.

Use.—Cinnamon bark has an agreeable odor and a slightly sweet taste, and is used mainly as a spice. It is

valued also in medicine as a cordial and stimulant, as well as in the manufacture of incense. The flavor of cinnamon is due principally to a volatile oil which contains 80 to 85 per cent of cinnamic aldehyde. Cinnamon oil is made chiefly in Ceylon from inferior bark, broken quills, and chips. The yield of oil is .5 to 1 per cent.

CLARY

Clary (*Salvia Sclarea* L.) is an erect biennial herb which grows as high as two or three feet, a member of the mint family (Labiatae) and a native of southern Europe. The popular and specific name is a corruption of the Latin word *clarea* which means "clear" or "bright," in reference to the color of the flowers. Clary was a pre-linnaean name for the plant. Syria has been considered the original home of the plant, but Italy also is mentioned, the presumption being in favor of the former. The plant is rarely seen in America, except in foreigners' gardens.

History.—Clary was introduced into England prior to 1538, when Turner published his book on garden lore.

Use.—The plant is seldom used in America and England and is less popular than formerly, having been replaced by sage. Wine is sometimes made from the plant when it is in flower.

CLOVES

Cloves are the undeveloped blossoms, dried in the air, of an evergreen tree, *Eugenia aromatica* Baill. (*Caryophyllus aromaticus* L.). This is a small tree belonging to the myrtle family (Myrtaceae), whose species are natives of tropical and subtropical regions all over the world. Many plants of this family are aromatic but none so highly so as this species, and none is as valuable in commerce. The trees grow from twelve to twenty feet tall and in some places as high as forty feet. Cloves are so named from



CLOVES

the French word *clou* meaning "nail," an object which they somewhat resemble.

According to Rumphius, a walk in the clove woods when the trees are in bud or flower is said to cause headaches, but, as he points out, the season in Amboyna—October and November—is a hot one, and the heat probably is the cause of the discomfort.

At one time or another this tree has been introduced into nearly all parts of the tropics, experimentally at least, but comparatively few attempts have been made in most tropical countries to cultivate it on a large commercial scale. The tree is of relatively slow growth and its product is of limited demand, so that a very extended area of cultivation is not required to stock the world's market.

The clove tree was originally indigenous to the Philippines and to some of the Moluccas or, as they are frequently called, "Spice Islands," namely, Tidore, Ternate, Mortir, Machian, and Batchian, volcanic islands in the neighborhood of Gilolo.

It is now cultivated in Guiana, Zanzibar, Pemba, Java, Sumatra, Reunion, Amboyna, Mauritius, Madagascar, and the West Indies as well as in the Spice Islands. Zanzibar and Pemba together grow 90 per cent of the world production.

History.—The earliest record of this spice is in Chinese books dating from 266 B.C. to 220 B.C., wherein officers of the court are required to hold cloves in their mouths when addressing their sovereign. Pliny mentions a spice as occurring in India, which was probably cloves. From the eighth century onward it was regularly imported into Europe. Marco Polo describes it as being obtained from Java and China. Oil of cloves is mentioned in the drug ordinance of the city of Berlin in 1574.

The Portuguese held control of the Spice Islands until 1605, when they were expelled by the Dutch, who main-

tained almost complete monopoly of the spice trade until the eighteenth century.

Use.—Cloves are used mainly as a spice. They are employed for flavoring, as, for instance, in hams. Cloves are chewed to flavor the breath and are used by betel nut chewers as an addition to the betel nut and sirih leaf. They contain 15 to 19 per cent of oil which is used in perfumes and articles of the toilet and in grease, soaps, and spirits.

From 76 to 85 per cent of clove oil is made up of eugenol. By oxidation eugenol is changed into vanillin. Vanillin is artificial vanilla and is used as a substitute for vanilla (see vanilla).

CORIANDER

Coriander (*Coriandrum sativum* L.) is a hardy annual herb of the carrot family (Umbelliferae). The name coriander is derived from the Greek word *coris*, "a bug," in allusion to its odor. It is indigenous to the Mediterranean region and formerly was cultivated in England, but it is grown largely also in northern India, France, and Germany.

History.—Coriander has been cultivated from such ancient times that the exact place of its first appearance is unknown. It is mentioned in early Egyptian papyri, and its seeds have been found in Egyptian tombs of the Twenty-first Dynasty (1000 B.C.). To Sanskrit authors it was known as *kustumburu*. It is mentioned in the Bible as having a resemblance to manna (Exodus and Numbers). Pliny wrote that the best quality came to Italy from Egypt. It is mentioned by Cato in the third century. Before 1066 it was well known in Great Britain, probably having been taken there by the Romans. Coriander is mentioned also among the useful plants recommended for cultivation by Charlemagne, but it appears to have received only slight consideration by the Germans in the

Middle Ages. The fruit is mentioned in the medical and distilling books of the sixteenth century. It was introduced into Massachusetts before 1670.

Composition.—The fruit possesses a peculiar flavor suggestive of bugs, due to the nature of the aromatic oil contained in it when unripe; when ripe and dry it has a more pleasant aromatic taste. This oil contains 90 per cent of coriandrol and d-pinene; coriandrol yields citral on oxidation and may be converted into geraniol.

Use.—Coriander seed is used in comfits and other confectionery and in breads, especially in the East. It is also an ingredient of curry powder and other condiments. Certain distilled liquors, such as gin, are partially flavored by it. The leaves are used by Chinese cooks in Singapore and elsewhere for flavoring soups and as "sumbul" in curries.

The oil is taken from the fruit in commercial quantities in Russia, Moravia, and Thuringia.

CUMIN

Cumin (*Cuminum Cyminum* L.) is a low-growing annual herb of the carrot family (Umbelliferae), said to be a native of the Nile Valley. It has been cultivated in the Mediterranean region, Arabia, Egypt, Morocco, India, China, and Palestine from very early times.

History.—Mention is made of this plant in the Bible (Isa. 18:25-27 and Matt. 23:23). According to the *Papyrus Ebers*, cumin and caraway seeds have been found in Egyptian graves. Pliny considered cumin the best appetizer of all condiments. It was known in England toward the end of the thirteenth century and in Germany in the fifteenth century. At present it is extensively cultivated in Malta and Sicily, but will mature seeds as far north as Norway. The plant is very seldom seen in America.

Composition.—The seeds have a peculiar strong aromatic odor and hot taste. This is due to a volatile oil, which consists chiefly of cumic aldehyde.

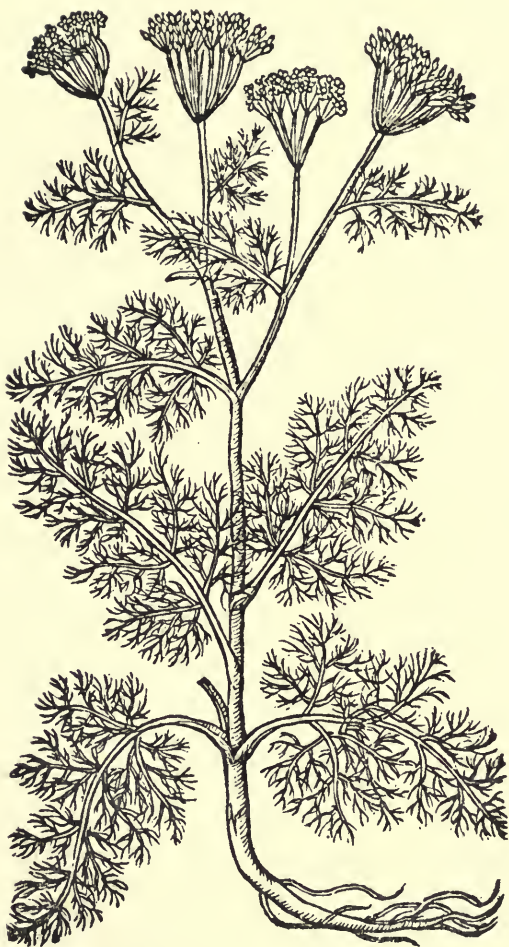
Use.—The seeds are used in India in curry powders and in France for seasoning pickles, pastry, and soups. In Germany the seeds are frequently mixed in breads and cakes and in Holland they are employed to flavor cheese.

DILL

Dill (*Anethum graveolens* L.) is a hardy annual or biennial herb of the carrot family (Umbelliferae), which includes also caraway, coriander, fennel, cumin, parsley, anise and angelica. It is said to be a native of the Mediterranean and Black Sea regions, and occurs as a weed in cereal crops in southern Europe and south to Egypt and Abyssinia. It grows spontaneously also in America in many places. In India it is grown in the same way as coriander.

History.—It was cultivated by the Greeks and Romans and in ancient times was planted in Palestine. The word translated “anise” in the Bible (Matt. 23:23) is said to have been “dill” in the original Greek. In Pliny’s time it was well known and it was often discussed by writers in the Middle Ages. It was cultivated in England as early as the tenth century, and in America it has been grown for over a hundred years.

Use.—In India it is used as an ingredient in curry powder and also as a substitute for caraway seed in seed cakes. The French employ dill for flavoring preserves, cakes, and pastry, and add the seeds to soups, sauces, and stews. Probably it is most used in pickles, especially in preserving cucumbers according to German recipes. The essential oil of the seed is utilized for perfuming soaps. Sometimes the seeds are soaked in vinegar to make dill vinegar.



From Lobel, Kruydtboeck, 1581

DILL

FENNEL

Fennel (*Foeniculum vulgare* Hill) is a biennial or perennial herb of the carrot family (Umbelliferae). It is considered to be a native of southern Europe, although it is commonly found on all the Mediterranean shores. It has spread with civilization, especially where Italians have colonized, and now is found wild as an escape from cultivation in many parts of the world, upon dry soil near the sea coast and on river banks. It is thus found on the chalky lands of England and the shelly formation of Bermuda. At the present time fennel is most popular in Italy and France.

History.—Fennel was cultivated by the Romans for its aromatic fruits and succulent edible shoots. Fennel was known to the ancient Chinese, Hindus, and Egyptians principally as a kitchen spice. No mention is made of it in the translations of the Bible. Frequent mention of it is found in Anglo-Saxon cookery prior to the Norman Conquest in 1066. Charlemagne ordered its cultivation upon the imperial farms.

Composition.—The characteristic odor and taste of fennel are caused by a volatile oil, found in the leaves and other parts. This oil contains anethol, fenchone, dextropinene, methylchavicol, and phellandrene.

Use.—Three hundred years ago the plant is said to have performed wonders in a medical way. Parkinson states in his *Theatrum botanicum* in 1640 that it has among its virtues the property for people who “are grown fat to abate their unwieldiness and make them more gaunt and lanke.” At the present time it is considered indispensable in French and Italian cookery. Young plants and leaves are minced and added to sauces to be served with puddings, soups, and fish. The famous *carosella* of Naples is made from the stems, which are cut when the plant is about to bloom. The seeds are used in cookery,

confectionery, and liquors. The volatile oil from the seeds is added to perfumes and scented soaps.

FLORENCE FENNEL

This fennel (*Foeniculum dulce* DC.) belongs to the same family (Umbelliferae) as the common fennel. It is a dwarf annual herb, said to be a native of Italy, which is used only as a vegetable.

FENNEL FLOWER

Fennel flower (*Nigella sativa* L.) is a Mediterranean annual herb of the buttercup family (Ranunculaceae), grown to a limited extent in southern Europe but scarcely known in America.

Use.—Among the Romans it was esteemed in cookery, hence one of its common names is Roman coriander. The seeds are used in flavoring and like dill seed in cookery.

GALANGAL

Two spices are known as galangal, the lesser and the greater galangal; both are species of the genus *Alpinia* and members of the ginger family (Zingiberaceae).

Lesser galangal (*Alpinia officinarum* Hance) is an herb with smooth, cylindrical, reddish-brown rootstocks. The lesser galangal has been cultivated extensively only in southern China.

History.—The earliest reference to this spice appears in the years A.D. 869 to 885, when the Arabian geographer, Ibn Khurdabah, wrote of it. It was not known to the ancient Greeks. Marco Polo speaks of it as grown in China at a very early date. It was imported into England with pepper and other spices and during the Middle Ages was largely used and is mentioned often in the literature of that time. The lesser galangal is shipped from Canton to other ports in China and to India and Europe.

Use.—Lesser galangal is aromatic and spicy and somewhat pungent in taste. It was formerly used as medicine like ginger, but this use has now become nearly obsolete, except that in Russia it is used as a drug and in veterinary medicine. As a spice it is used principally in making vinegar and beer, in cordials, and in liquors, especially in Russia in the liquor called *nastoika*.

The oil of the galangal was manufactured very early and was first mentioned in a price ordinance of Frankfort in 1587.

Greater galangal (*Alpinia Galanga* L.) is a very common plant in cultivation in Java and in the Malay Peninsula. In these localities it forms an ingredient in curry, and is also used in local medicine. The plants are larger than those of the lesser galangal and, as one might expect the rootstocks are also larger.

GARLIC

Garlic (*Allium sativum* L.) is a member of the lily family (Liliaceae) and a native of southern Europe. The bulbs and leaves are employed in seasoning salads and soups and the stems are often added to sausages and other ground meats. Garlic belongs to the same genus as chives, leek, onions, shallot, and the Welsh onion. The whole plant, especially the bulb, has a peculiar taste and smell, which is quickly communicated to the breath and perspiration of the consumer. This is due to an essential oil, chiefly allylsulphide. (C_3H_5S) or allylsulphocyanide, which is found also in many cruciferous plants.

GINGER

As a rule, spices grow above the ground, but ginger is an exception; it is the roots or rhizome of a tropical plant, *Zingiber officinale* Roscoe, of the ginger family (Zingiberaceae).



GINGER

Ginger is said to be a native of southern Asia and was long cultivated by the ancient Chinese and Hindus. The area in which it is now successfully cultivated is perhaps larger than that occupied by any other spice, although there are a good many regions in which it might be grown but which have not as yet produced any quantity. In India, Malay Peninsula, Malay Archipelago, China, Fiji, northern Australia, west Africa, and as far south as Natal, and in the West Indies and Central America, it thrives and is cultivated successfully. Ginger is grown from cuttings of the rootstocks and not from the seeds. Calcutta exports more than any other city, although a great deal comes from China and Japan. The finest white ginger comes from Jamaica. As ginger is propagated from cuttings, there do not appear to be many varieties.

Ginger comes into the market in two forms: dried or cured ginger and preserved or green ginger. In the West Indies and India the spice is prepared as dry ginger, while China supplies the greater part, indeed practically all, of the preserved ginger. There are several methods used in the preparation of dried ginger. The unpeeled rhizomes may be cleaned, placed in hot water or lime water for a time, and dried; or the peeled ginger is placed in water, which may be acidified, as is done in Jamaica, and dried.

The Chinese product excels all other preserved ginger. While the tubers are still young, green, tender, and full of juice, they are taken from the earth, buried in another place for a month, and then dried in the sunshine for a day. The roots are then cleaned and scalded until sufficiently tender. They are next put into cold water, peeled, and scraped, then they are placed in a jar and covered with successive sugar solutions of increasing strength; the final syrup is made of a pound of syrup for each pint of water. The odor of ginger is due to a volatile oil, and the pungent taste is caused by a resin.

History.—Ginger was one of the earliest of spices known to the Europeans. The name ginger is derived from the Sanskrit *sanjabal*, through the Arabic *zanzabil*. The Greeks and Romans appear to have obtained it from the Arab traders of the East, who doubtless brought it from India. The exact original home of ginger is unknown as no one has found it in a wild state. It was very early distributed over tropical Asia from India to China. In the third century A.D. it was listed among the Indian products brought to Europe via the Red Sea and Alexandria. The ginger root is easily transported in a living state and this no doubt accounts for its rapid spread throughout the tropics. Ginger was well known in England before the Norman Conquest (1066). In the thirteenth and fourteenth centuries it was common in England and was valued next to pepper, which was the most common of all spices. It was introduced to America very soon after the discovery and before any other oriental spice. Ginger was exported from Santo Domingo as early as 1585, from Barbados in 1694, and Renny, in his *History of Jamaica*, states that in 1547 it was exported from Jamaica to Spain. Since very early times Jamaica has supplied ginger continuously.

Use.—Ginger is principally used as a spice and is one of the most popular flavoring agents known. It is used as a condiment in ginger beers, ginger champagnes, and other beverages. In the East the fresh rhizomes are used in curry. Oil of ginger is extracted from the rootstock to serve as a basis for the tincture or essence of ginger.

HOARHOUND

Hoarhound (*Marrubium vulgare* L.) is an aromatic herb of the mint family (Labiatae) which grows from one to three feet high and is a native of Europe, northern Africa, and non-tropical Asia. It has become widely naturalized in many parts of the world, including the

United States, and is in some places troublesome as a weed. The plant was formerly highly esteemed in cookery and medicine, but is now almost out of use except in candy. Some people still eat hoarhound candy in the belief that it relieves tickling in the throat caused by coughing.

HORSE-RADISH

The well-known condiment, horse-radish (*Armoracia rusticana* G., M. & S.) belongs to the family Cruciferae, of which cabbage, turnips, and mustard are members. It is a native of Europe and a common garden plant in the United States. In this country it is found growing wild as an escape in some places, especially in New York, where it is very troublesome as a weed. Horse-radish is a hardy plant, with a white, fleshy, cylindrical root which branches at the lower end; the fibrous roots may penetrate to a depth of six or seven feet. The familiar pungent odor and hot biting taste of horse-radish are due to a volatile oil formed from the glucoside, sinigrin. The penetrating odor causes tears to flow and can not be distinguished from that of mustard oil. In fact, the active principle of horse-radish is quite like the active principle of mustard. The volatile oil of horse-radish consists chiefly of sulphocyanate of butyl. This substance is not free in the roots but is developed from a glucoside by the action of water aided by an enzyme when the root is crushed.

Use.—Horse-radish roots are grated and scraped, sometimes mixed with vinegar, and used as a condiment, especially with roast beef and oysters.

HYSSOP

Hyssop (*Hyssopus officinalis* L.) is an herbaceous evergreen undershrub, which grows to a height of a little over a foot. It is a native of Europe and temperate Asia.

Hyssop is an ancient name, but exactly what plant was the sacred hyssop of the Jews is uncertain. The plant was well known in ancient times, and during the Middle Ages it was grown for fancied medicinal qualities, ornament, and cookery. Now it is very little cultivated except in ornamental garden borders. The leaves are not employed in culinary practice now, as they are considered too strongly flavored. Sometimes they are used in salads to supply a bitter taste. The colorless oil which may be distilled from the leaves turns yellow and changes to a resin upon contact with the air.

JUNIPER

Juniper berries (*Juniperus communis* L.) are the fruits of a small evergreen tree of the pine family (Pinaceae). It is found widely distributed over the northern hemisphere in Europe, Asia, and North America. The berries are the size of a pea, having a sweet pulp; when dry they are black, and have a sweet bitterish (balsic) flavor. The chief properties of the berries are contained in a volatile oil which consists principally of three substances, pinene, cadinene, and juniper camphor. The main use of juniper fruit is to flavor Holland and Gordon gin. Because of its use in these spirits the latter are called "geneva" or "gin," from *genièvre*, the French name for the berries.

CHERRY LAUREL LEAVES

Cherry laurel (*Prunus Laurocerasus* L.) belongs to the rose family (Rosaceae). It is a slender tree or small bush, and is probably native from southeastern Europe to Persia.

The leaves have a taste and flavor resembling bitter almonds, and according to Lehmann they yield 1.38 per cent of prussic acid. The chief constituent of the leaves is a glucoside, laurocerasin, which may be split by the

enzyme emulsin into dextrose, hydrocyanic acid, and benzaldehyde.

History.—The plant appears to have become known in Europe toward the beginning of the sixteenth century. The watery distillate from the leaves has been used medicinally since the first half of the eighteenth century, and its poisonous properties were observed repeatedly.

Use.—Cherry laurel leaves are used to flavor custards, blancmange, and puddings.

LAVENDER

Lavender (*Lavandula Spica* L.) is a perennial under-shrub of the mint family (Labiatae), a native of the Mediterranean region. The common name is derived from the Latin word *lavare*, to wash or bathe, because a distillation from the flower has been used since ancient times to perfume water used in baths.

Composition.—It yields oil of spike, which has an odor of lavender and rosemary. The oil contains camphor, borneol, cineol, linalool, and camphene.

Use.—Lavender sometimes is grown for use as a condiment in salads, dressings, etc. In southern France and England it is grown for perfume, which is now its chief use. Lavender flowers are dried and used in sachet bags to perfume clothes.

LOVAGE

Lovage (*Levisticum officinale* Koch) is a perennial plant of the carrot family (Umbelliferae) found growing wild in the mountains of southern Europe. Formerly the plants were employed for a variety of purposes, but now practically their only use is in confectionery, for which purpose the young stems are preserved in sugar like angelica. The leaf stalks and stem bases at one time were blanched and eaten like celery.

History.—The Romans cultivated lovage as a kitchen spice and possibly also for medicinal purposes. Its cultivation north of the Alps was no doubt caused by Charlemagne's *Capitulare* of 812. The German medical treatises of the Middle Ages, beginning with that of the Abbess Hildegard of the twelfth century, mention lovage.

MARIGOLD

Marigold (*Calendula officinalis* L.) is an annual herb of the sunflower family (Compositae), a native of southern Europe. The flower heads are sometimes dried and used in broths, soups, and stews, but probably the flavor is too pronounced for American palates. The fresh flowers are utilized to a certain extent to color butter.

MARJORAM

Two species of marjoram are now grown for culinary purposes: pot or perennial marjoram (*Origanum vulgare* L.) and sweet or annual marjoram (*Origanum Majorana* L.). Both are perennials, but sweet marjoram is more sensitive to frost and is therefore cultivated as an annual in temperate climates. *Origanum vulgare* is a native of Europe, a member of the mint family (Labiatae) which has become naturalized in many places of temperate climate, and occurs wild as an escape from cultivation in the Atlantic States. *Origanum Majorana*, a native of northern Africa, Greece, and other countries bordering the Mediterranean, is now cultivated in many gardens for culinary purposes. The name *Origanum* means "delight of the mountains," and is derived from two Greek words.

Composition.—The principal constituent of marjoram is a volatile oil which consists of terpinene, some terpineol, and small quantities of acetic and other organic acids.

History.—Marjoram is one of the spice plants of antiquity. The hyssop of Luther's translation of the Bible

does not refer to *Hyssopus* but to *Origanum*. *Origanum vulgare* is mentioned by Pliny and by Albertus Magnus, an English herbalist of the Middle Ages. The volatile oil of the plant was used during the latter part of the Middle Ages and is mentioned in the German ordinances of the sixteenth century. *Origanum Majorana* is sacred in India to Vishnu and Siva.

Use.—The leaves, flowers, and tender stems of both species have a peculiarly aromatic and fragrant odor and are used like other plants of the mint family, in seasoning soups, stews, dressings, and sauces, especially in France and Italy. They are popular also in England and America. In Europe the plants are grown for their oil to be used in perfume and toilet articles, especially soap. The oil, however, is less popular than that of thyme.

MUSTARD

Black mustard (*Brassica nigra* Koch) is cultivated in most civilized countries, especially in those of central Europe. It is a member of the mustard family (Cruciferae). In the United States it has become naturalized and is frequently a troublesome weed. Mustard grows almost anywhere, and is found in Europe, north Africa, Asia Minor, United States, Mesopotamia, West Indies, south Siberia, and China. It is cultivated to a large extent in Bohemia, Holland, Italy, and England. In the United States *Brassica nigra* seed is produced commercially in California and Kentucky. Black mustard seed is yellow inside, while white mustard seed is white within; likewise, black mustard furnishes more aroma and is sweeter and gives more volatile oil.

History.—Mustard is mentioned in the Bible in Matt. 13:31, Luke 13:18–19. It is referred to as an external remedy by Theophrastus, Dioscorides, and Pliny. In the writings of Columella are found the oldest directions

for the preparation of ground or table mustard. About the year 800 mustard was cultivated in the neighborhood of Paris. Its cultivation was directed by Charlemagne in his *Capitulare* of 812. In Spain it was grown by the Arabians. From here its cultivation spread to Germany and France in the tenth century, and thence to England during the twelfth century. Ground mustard, as we know it, was first prepared in Durham, England, by a lady of that city from the ground seeds of wild mustard, which grew plentifully in that district. Table mustard rapidly increased in reputation, until it became a famous condiment throughout Europe.

Composition.—The pungent odor is due to a volatile oil which is formed from a glucoside. The glucoside is broken down readily when in contact with water into glucose or grape sugar, potassium acid sulphate, and mustard oil.

Mustard oil has a very sharp taste and acts upon the skin as a strong irritant.

Use.—The leaves are employed mainly for garnishing; they are used also in salads and in the preparation of meat dressings and sauces. Table mustard is the ground seed of black mustard.

WHITE MUSTARD

White mustard (*Sinapis alba* Rabenh.) is said to be a native of Asia and Europe. The seed is white inside, its aroma is not as sweet, and the seed contains less volatile oil than black mustard. The white mustard plant has characteristics very similar to those of black mustard. It is distinguished from the latter chiefly by lighter-colored bristly pods and lighter-colored and larger seeds. White mustard seed also contains a glucoside, in this case called sinalbin, which breaks down into glucose, sinapine sulphate, and white mustard oil, through the action of an

enzyme, myrosin, and water. The pungent mustard oil is noticeable only when heated; when cold it has only a faint anise-like odor. White mustard oil is an oily liquid of a burning taste, which causes blisters to form on the skin when in contact with it, but it is much slower in action than black mustard oil.

Use.—White mustard is used similarly to black mustard, although the mixed mustard from this spice is less pungent.

NUTMEG and MACE

Nutmeg and mace, *Myristica fragrans* Houtt. (Myristicaceae), are produced by the same tree. The nutmeg tree is evergreen and dioecious, and grows to a height of sixty feet, but is usually found much smaller. It is grown principally in the Banda Islands of the East Indies. The genus *Myristica* contains about one hundred species of the Old World tropics, but of greatest abundance in the Malayan region. Although so large a number of wild nutmegs are known, only one species contains enough of the aromatic principle, myristicin, to be of any value for cultivation. A few others which are slightly aromatic are occasionally collected by the natives, more to adulterate true nutmeg than for separate use. Nutmeg trees are usually unisexual, each tree bearing male flowers or female flowers only, but it is not uncommon to find a tree with flowers of both sexes upon it. Some say "that a male tree, bearing for a number of years, usually about six, frequently commences to produce female flowers and eventually becomes wholly female." To aid fertilization it is a common practice to graft branches from male trees on the trees that produce female flowers.

The fruit of the nutmeg tree is oval or pear-shaped and pale orange-yellow in color. When ripe the fleshy husk splits in half, exposing the seed, the nutmeg of commerce, enclosed in a deep round shining seed-coat, the



NUTMEG AND MACE

testa, and over this is a splendid crimson network, the mace, which envelops the testa. The mace, which is an aril, is an outgrowth from the base of the seed and is attached to it only at the base, although it closely enwraps it to the top. The mace is rather leathery in texture and is cut into narrow flaps of irregular form.

The nutmeg tree is a native of the eastern islands of the Moluccas, known also as the Spice Islands, from the presence of this plant and the clove tree. Blume states that it is wild in Ceram and the southern and eastern islands of the Malay Archipelago. It is indigenous also to Banda, Amboyna, Gilolo, and western New Guinea. The tree is said to be grown to a small extent in Brazil and Jamaica.

History.—The nutmeg apparently was not known to the Greeks and Romans. It was imported in the early days by the Arabian traders from the East Indies and was mentioned by Aetius at Constantinople about A.D. 540. Nutmegs were used in Rome in 1191 at the coronation of Henry VI. Nutmeg oil is mentioned in the apothecaries' price ordinances of Berlin in 1574.

The Portuguese located the home of the plant in Banda in 1512 and held the trade in this spice until driven out by the Dutch, who held the monopoly for many years. The present price is too low to induce further extensive planting.

Uses of mace.—Mace is used chiefly as a spice. It contains about 8 per cent of a volatile oil, which is colorless, very fragrant, and quite unlike that of the nutmeg seed. The flavor is quite similar to the nutmeg but nevertheless distinct, and preferred by some people. Mace is always in good demand and usually costs more per pound than the nutmeg, as it should since there is less produced.

Uses of nutmeg.—Nutmegs are used mainly as a spice. There are three principal kinds known to trade: the dark

brown from Penang, a pale brown from Java, and the long slender wild nutmeg from Macassar. Although Connecticut is known as the Nutmeg State, it is not because nutmegs were grown there, but because imitation wooden nutmegs are said to have been made there.

The flavor and odor of the nutmeg are due to a volatile oil of which the content varies from 8 to 10 per cent. It is straw-colored and contains myristicin and is used for scenting soap.

The concrete oil of nutmeg, which is used as a nutmeg butter, is obtained by crushing and pressing the seed. It is made chiefly in the Dutch East Indies and Penang, but a great deal has been manufactured in Europe. It is firm in texture and has a pleasant odor of nutmeg and a greasy and aromatic taste. Nutmeg butter consists of the vegetable fat known as myristicin and is used in soap making.

GRAINS OF PARADISE

Grains of paradise are the aromatic pungent seeds of one or more species of the genus *Amomum* of the Zingiberaceae. These plants are natives of west Africa, where they occur both wild and cultivated. They are widely distributed in Sierra Leone and Lower Guinea.

History.—In early times this spice was known as “Melegetae,” and the country that furnished it was called by the Portuguese “Terra de Malaguet.” This same country was known as the “Grain Coast” or “Pepper Coast” because of the presence of this spice. It was not known to the ancients; apparently the earliest record of its use was in a festival at Treviso in 1214. After this date there are more records of its use, indicating its common occurrence in commerce. In early times this spice was carried overland from the Mandigo country through the desert to Tripoli and shipped by the Italians from the port of Monti-de-Barca, on the Mediterranean coast. Because

they did not know the home of the seeds, they called them "grains of paradise." The seeds are now obtained chiefly from seaports at the place of production, the Gold Coast, the most important ports being Cape Coast Castle and Accra. The overland route has been abandoned.

Use.—Grains of paradise were used in the earlier days chiefly as a substitute for pepper and likewise as an adulterant of pepper. They were also an ingredient in the spiced wine called *Hippocras*, and more recently they have been used to give added strength to wines, beer, spirits, and vinegar. Although not a harmful drug, an act was passed in the reign of George III to stop their use by brewers or beer dealers. Queen Elizabeth is said to have been very partial to this spice.

PARSLEY

Parsley (*Petroselinum hortense* Hoffm.), of the carrot family (Umbelliferae), is a biennial or short-lived perennial which grows about two feet high. It is a native of Europe. The word parsley, by some process of derivation, is considered to have come from the Greek word *petros*, which means "rock." The natural habitat of the plant is the rocky coast of the Mediterranean. Parsley is one of the most widely grown of the garden herbs today. It has escaped from cultivation so that it occurs as a weed in moist cool climates. Nearly all the wild parsley in Europe consists, according to DeCandolle, of escapes from cultivation.

History.—An interesting fact observed by Palladius in A.D. 210 is that old parsley seed germinates more freely than freshly gathered seed. The plant was brought to England from Sardinia in 1548.

Composition.—All parts of the plant contain an oil to which its flavor and properties are due. The crude oil contains a stearoptene which crystallizes in needles.

Use.—The Germans used both the roots and tops for cooking, the former as boiled vegetables and the latter as a pot herb. In England the leaves are used for seasoning fricassees and dressings for mild meats, such as chicken and veal. In America the leaves are used most extensively as a garnish. In many countries the green leaves are used to mix with salad for added flavor.

PENNYROYAL

Pennyroyal (*Mentha Pulegium* L.) is a prostrate branching perennial herb of the mint family (Labiatae), a native of Europe and western Asia. The plant is now found wild and naturalized in many parts of the civilized world. England cultivates it more extensively than America. The flavor of pennyroyal is more pungent and acrid and less agreeable than spearmint or peppermint. The leaves, either green or dried, are used abroad to flavor puddings and other culinary preparations, but the taste and odor are usually not pleasant to American and English palates. Pennyroyal has been valued medicinally since the Middle Ages and possibly earlier. The distilled *oleum pulegi* is mentioned in the price ordinance of Frankfurt for 1582.

The pennyroyal native in the United States (*Hedeoma pulegioides*) is an altogether different plant, although it belongs to the same family. Both European and American pennyroyal have oils that closely resemble each other and one is substituted for the other. The volatile oils consist chiefly of a ketone, pulegone, which gives the oils their peculiar properties.

PEPPERS

Peppers belong to two plant families, the red peppers to the Solanaceae, or potato family, and the black peppers to the Piperaceae, or true pepper family. Other spices have been described as peppers, among them Jamaica

pepper, known also as allspice or pimento, and Melegueta pepper, a term which has been applied to grains of paradise (*Amomum Melegueta*).

BLACK PEPPER

Of all the varieties of spices used as condiments black pepper (*Piper nigrum* L.) is one of the few which grow on climbing plants. There is no kind of spice better known, more esteemed, or more universally used. Black pepper is the unripe dried berry of a plant native to southern India, now cultivated chiefly in that country and in the Malayan and Cambodian regions. Black pepper climbs eight to twenty feet high on trees or stakes. Plants are known to bear for twenty years.

History.—Pepper has been highly prized since antiquity; like gold it was used as a medium of exchange and as an article of tribute. It was known as a symbol of the spice trade. Dealers in spices in Rome were known as *piperarii*, later in France as *pebriers*, and in England as pepperers. Pepper was mentioned by Theophrastus in the fourth century B.C. Pliny states that in his time long peppers were worth fifteen denarii a pound, white peppers seven denarii, and black peppers four denarii. Marco Polo mentions pepper as being produced in Java in 1280. During the Middle Ages pepper was a most valued spice, and Venice, Genoa, and other European cities owed much of their wealth to its importation.

The demand for this spice and its costliness were the main inducements to the Portuguese to seek for a sea passage to India. The Venetians and Genoese had practically a monopoly of the spice, but when the Portuguese found the sea route in 1498 the price of pepper fell and in spite of the efforts of the Venetians to retain the traffic, it passed out of their hands into those of the Portuguese, who retained it till the seventeenth century.



BLACK PEPPER

Composition.—The chief active ingredient in pepper is piperine, a crystalline alkaloid common to all pepper-worts. This substance has a sharp taste and is present in amounts from 5 to 9 per cent. Piperine breaks down into piperidin and piperic acid. Pepper also contains a volatile oil and an oleo-resin, both of which contribute to the pepper flavor. Piperine is tasteless at first but has a burning after-taste. Piperidine is a colorless liquid with a caustic taste. A volatile oil is present in 1 to 2 per cent and contains dipentene, phellandrene, and a peculiar terpene. Its taste is pungent.

Uses.—Black pepper is more pungent than white pepper and is used as a kitchen spice and in preserving sausage. The substance piperonal, or artificial heliotrope perfume, is obtained from piperine by distillation.

In the time of Theophrastus it was supposed that white pepper was produced from a different plant than black pepper. White pepper, however, is the ripe berry after the removal of the outer coat of skin and pulp (pericarp and mesocarp). In preparing white pepper the berries are allowed to soak in water seven to ten days, then stamped under foot in tubs till the skin, pulp, and stalks are detached. White pepper is made also from dried black pepper by milling it in a special machine. Black pepper is soaked in water or milk of lime, previous to using decorticators. The hulls rubbed off are ground up and sold as pepper dust or as ground black pepper.

White pepper does not contain as much of the alkaloid piperine as black pepper nor is it as pungent.

LONG PEPPER

Two distinct kinds of pepper allied to black pepper are known as long pepper and as such are sold in the native markets of the East: *Piper longum* L., a native of India, and *Piper officinarum* L., a native of Java. They are

commonly known as Indian long pepper and Javanese long pepper. Long pepper was known to Theophrastus in the fourth century B.C. In 1589 the distilled oil from long pepper was admitted to the *Dispensatorium Noricum*.

Piper longum is native in Bengal, Nepal, Assam, and Khasiya and southward to Travancore, and is cultivated chiefly in the northern parts of India. It climbs like black pepper and is cultivated in exactly the same way in Assam and Mysore. Bengal is still the chief source of the long pepper of India. A certain quantity is exported from Calcutta to Europe, but the chief long pepper of commerce is the Javanese species. Indian long pepper is shorter and more slender than Javanese, has a darker color, and is less pungent.

Composition and use.—Long pepper contains the same principles as black pepper: a volatile oil, resin, and piperine, and it is used ground up as a spice in the same way as ground pepper, chiefly in its country of origin.

Piper officinarum L.—The plant and fruit are similar to the Indian long pepper. The pepper is more pungent. The plant flowers and fruits the year round and is grown chiefly in Java, Bali, Rhio, and other islands.

Use.—The spikes are gathered when they begin to turn red or yellowish and are quickly dried in the sun, or over a fire, because they are liable to rot if not speedily dried. They are used mostly in pickling and also as ground pepper for preserves, in Malaysia for curries. Javanese long pepper is the commonest of the two long peppers exported to Europe and is shipped chiefly from Singapore and Penang.

RED PEPPER

Red peppers are members of the genus *Capsicum*, of the tomato family (Solanaceae), and are natives of the American tropics. Two species produce the red pepper of



From Lobel, Kruidtboeck, 1581

RED PEPPER

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commerce, namely *Capsicum annum* L. and *Capsicum frutescens* L. *Capsicum frutescens*, which is much less cultivated than the other species, is a shrubby perennial, two and one-half to six feet high, with red fruit about one inch long. As its fruit does not ripen freely except in tropical and subtropical latitudes, it is not grown in the north for commercial use. The fruit is often called bird pepper.

Capsicum annum L. is an herbaceous or suffrutescent plant, which generally grows two to three feet high and has an annual or biennial habit. The fruits are very variable in size, color, and form. This species furnishes all the leading commercial varieties now in cultivation. In the temperate latitudes they are treated as annuals, while in tropical countries some varieties are biennial or perennial. This species has many common names, such as red pepper, Guinea pepper, chile, paprika, and pimento. Its cultivation does not appear to have been confined to any particular place, but is of general distribution throughout temperate and tropical regions, for the supply of local markets. It is grown especially in southern Asia, Africa, México, and South and Central America.

The very sweet Spanish variety is cultivated in Spain and various other countries. The *tabasco* variety is almost entirely confined to Louisiana. Where pickles, mangoes, and pepper sauce are extensively made, there is generally a local supply grown in the vicinity.

History.—*Capsicum* seems to have been first mentioned by Peter Martyr in a letter dated September, 1493, in which he said that Columbus brought home "pepper more pungent than that from Caucasus." Following the discovery of America, the plant was spread rapidly throughout the Old World tropics. The natives of South America used it as much in ancient times as they do now. Oviedo, who came to America in 1514 from Spain, men-

tions its uses, and Chanca, physician to the fleet of Columbus in his second voyage to the West Indies in 1494, wrote a letter to the chapter of Seville in which he speaks of it as a condiment.

Composition.—Two crystalline pungent principles are found in red pepper, principally in the partitions of the fruit and in the seeds: capsaicin, which is slightly soluble in water and is volatile at 115° C., forming irritating vapors; and capsacutin, which is so powerful that one part in 11,000,000 of water has a distinct pungent taste.

Use.—Red pepper is used more as a condiment than for any other purpose. The inhabitants of some warm climates season almost every dish with it. Cayenne pepper consists mainly of the fruits of the small pungent varieties reduced to a fine powder. It is much more pungent than paprika. Paprika is the Hungarian name for red pepper, and the word is used also to designate a specially prepared powdered form of red pepper. This paprika powder is made from large, less pungent varieties of peppers, while cayenne pepper is made from small pungent varieties. There are two ways of preparing paprika. It is sometimes made by mixing wheat flour with the pulverized dried fruit and adding yeast to form a cake. After baking until hard and brittle the cake is reduced to powder and sifted. Paprika is also prepared from fruit which is ground after the seeds have been removed. Tabasco pepper sauce or liquid pepper is said to be the pulp of the ripe fruit of the small tabasco variety, extracted by pressure and handled in such a manner as to retain all the flavor, strength, aroma, and color of the fruit. Many varieties of *Capsicum* are employed in pickles in its green or ripe state. The milder pepper is preferred in the North, the more pungent pepper by Southerners. Peppers may be sliced and mixed with salads or served like tomatoes, with vinegar or salt. The bell-shaped or squash varieties, after the

seeds have been removed, are filled with various substances. The ground pepper is used also to stuff pitted olives, which commonly appear in trade labeled "pimento stuffed olives." In Europe as well as in the United States some of the smaller varieties of peppers are potted and used as house plants. The United States imports about four million pounds of paprika a year.

PEPPERMINT

Peppermint (*Mentha Piperita* L.) is a strong-scented perennial herb of the Labiatae, or mint family, native to Europe. This plant has long been known and grown in the gardens and fields of Europe, Asia, and the United States. In America and probably in these other countries it is common as an escape from cultivation. Peppermint includes a group of botanically unstable species and varieties of mint that produce menthol, or an oil possessing the properties of peppermint oil. In Europe and North America several varieties are cultivated for the distillation of the oil. The plant is cultivated especially in England, Germany, Italy, and Russia; Japan cultivates a different species. In North America the principal areas of production are in New York, Michigan, and Indiana. The state of Michigan produces more than any other place in the world.

History.—Although several mints have been used for culinary and medicinal purposes since antiquity, no well-defined distinction is made, even in the books on distillation. They were popular in the fifteenth and sixteenth centuries, during which period mints were extensively used for the preparation of distilled waters.

Use.—Peppermint has a refreshing odor and a cooling persistent taste. The volatile oil of the plant, to which its characteristic odor and taste are due, is more in use than the leaves. This oil is best known as a flavor in con-



From Lobel, Kruidtboeck, 1581

PEPPERMINT

fectionery and in the historic mint julep, but is used also in the manufacture of soap and perfumes. On account of its penetrating odor, sanitary engineers use the oil to test the tightness of pipe joints. The volatile oil has as its principal constituent 50 to 60 per cent of the stearoptene menthol.

The mint family claims many other spice plants such as sage, savory, hyssop, balm, pennyroyal, lavender, marjoram, spearmint, thyme, rosemary, catmint and hoarhound. The plants have square stems, simple, opposite leaves and two-lipped flowers.

POPPY SEED

The seed of the opium poppy (*Papaver somniferum* L.), of the poppy family (Papaveraceae), is produced in India, Russia, Czechoslovakia, and other European countries. It is used as a condiment on rolls. The oil contained in large amounts in poppy seeds closely resembles olive oil.

ROSEMARY

Rosemary (*Rosmarinus officinalis* L.), as the name implies, is a native of the seacoasts. "Rose" comes from *ros*, meaning "dew," "mary" from *marinus*, referring to the ocean. The plant, a member of the mint family (Labiatae), is a native of the Mediterranean coast and is of common occurrence on the chalky hills of southern France as an evergreen shrub, two to four feet high.

History.—Pliny, Dioscorides, and Galen wrote about it. The Spaniards cultivated it in the thirteenth century, and from the fifteenth to the eighteenth century it was popular as a condiment with salt meats in Europe. Since then its popularity has declined.

Composition.—The peculiar odor of rosemary is due to its volatile oil, composed of 15 to 18 per cent of borneol,

5 per cent of bornyl acetate, and smaller amounts of pinene, camphene, camphor, and cineol.

Use.—Rosemary was once thought to strengthen the memory, and thus was considered an emblem of remembrance and fidelity. This is said to have originated the old custom of wearing it at a wedding in many parts of Europe. "There's rosemary, that's for remembrance" (*Hamlet*, Act IV, scene 5).

Rosemary is now used for seasonings almost exclusively by the Italians, French, Spanish, and Germans. The tender leaves are used in cooking stews, fish, and meat sauces. Such uses are not popular in America. In France the plant is grown also for a volatile oil which is used in perfumery, eau de Cologne, and Hungary water.

RUE

Rue (*Ruta graveolens* L.) is a perennial herb, a member of the orange family (Rutaceae), a native of southern Europe.

History.—In olden times it had a high reputation among the Greeks and Romans for seasoning and medicines. In Pliny's time it was considered effectual for eighty-four maladies. Apicus mentions it among the condiments in the third century, and Magnus in the eleventh century praises it among the garden edibles. Probably because of its acidity and ability to blister the skin when much handled, rue has been chosen by the poets to express disdain. Shakespeare called it the "sour herb of grace."

Use.—The exceedingly strong smell of the leaves is very disagreeable to most Americans and for that reason it can not become popular here as a seasoning. It is used by people who like bitter flavorings in culinary preparations and in beverages. The volatile oil, to which some

of its odor and taste is due, is found in the entire plant and is used in aromatic vinegars and toilet preparations.

SAGE

Sage (*Salvia officinalis* L.) of the mint family (Labiatae) is the most extensively cultivated of all aromatic herbs. It is a shrub-like perennial, native to southern Europe and northern Africa, and is cultivated in many countries of moderate climate as a garden plant for medicinal purposes. The plant will grow in a cold climate as far north as the northern part of Norway. The name *salvia* is derived from *salvere*, "to be in good health" and "to heal." The definition of the word "sage," which means "wisdom," has a different origin.

History.—Sage appears to have been used as a medicinal herb at the time of the Romans. It was called *salvia* by Pliny, and was one of the plants recommended by Charlemagne for cultivation. In the *Destillerbuch* of 1500 by Brunschwig a distinction is made between large and small sage for the distillation of sage water.

Composition.—The odoriferous volatile oil of sage contains pinene, cineol, thujon, borneol, and a bitter principle.

Use.—In ancient times sage was one of the most highly esteemed of all plants because of its reputed health-insuring properties. An old adage reads: "How can a man die in whose garden sage is growing?"

The leaves have a highly aromatic odor and are used for seasonings and dressings, especially to disguise strongly flavored meats such as pork, goose, and duck. Sage is used also to flavor certain kinds of sausages and cheese. It owes its odor to a volatile oil used in perfumery.

SAMPHIRE

Samphire (*Crithmum maritimum* L.) is a European perennial of the carrot family (Umbelliferae). It occurs

commonly along seacoasts in some parts of Europe. The young tender leaves and shoots, which are aromatic and saline, are pickled in vinegar, either alone or with vegetables.

SUMMER SAVORY

Summer savory (*Satureia hortensis* L.) is an annual plant of the mint family (Labiatae), a native of the Mediterranean countries. It is grown in gardens in various parts of the world. In America it is cultivated in Ohio, Illinois, and some of the western states, where it is occasionally found wild as an escape from home gardens.

History.—Among the Romans both summer and winter savory were popular two thousand years ago, not only for flavoring but for use as pot herbs.

Composition.—Both summer and winter savory have powerful aromatic odors and warm, rather bitter tastes, which are due mainly to their volatile oil. The leaves are sometimes nearly covered with small vesicles containing this oil. The oil consists of carvacrol, cymene, terpene, and a phenol which differs slightly from carvacrol.

Use.—Up to one hundred years ago, savory was used in flavoring cakes, puddings, and confections, but these uses have declined. Summer savory is now used to flavor salads, dressing, gravies, and sauces used with meats, such as veal, pork, duck, and goose. It is used also for croquettes, rissoles, and stews. Summer savory is considered a better spice plant than winter savory.

WINTER SAVORY

Winter savory (*Satureia montana* L.) is a semi-hardy perennial plant, native to southern Europe and northern Africa. Like summer savory, it has been used as a flavoring for many centuries, but it is not as popular as formerly nor is it as popular as summer savory.

SESAME OR BENE SEED

Sesame seed, widely used as a condiment on rolls, is produced by an herb, *Sesamum orientale* L., of the sesame family (Pedaliaceae). It has been extensively cultivated in the tropics since ancient times. The seeds yield about one-half their weight of oil of sesame, which is odorless, of agreeable flavor, and does not easily become rancid. The seeds are sprinkled on rolls before baking, like poppy seeds. In some tropical regions they are highly esteemed for flavoring candy.

SOUTHERNWOOD

Southernwood (*Artemisia Abrotanum* L.) is a perennial subshrub of the sunflower family (Compositae), a native of southern Europe. The plant is grown often in old-fashioned gardens as an ornament under the name of "old man." The young shoots are used sometimes for flavoring cakes and other culinary preparations.

SPEARMINT

Spearmint (*Mentha spicata* L.) is a perennial herb native to the Mediterranean region, but now found naturalized in nearly every civilized country. Mint is said by the poets to derive its name from Minthe, the daughter of Cocytus. They say that Proserpine became jealous of Minthe, and transformed her into a plant.

History.—The plant is mentioned in the Bible (Matt. 23:23), and John Gerarde, a famous botanist of the seventeenth century, says, "The smelle rejoyceth the heart of man."

Composition.—The oil upon which its flavor and properties depend contains pinene ($C_{10}H_{16}$) and a stearoptene ($C_{10}H_{20}O$), which is isomeric with carvol.

Use.—The green and dried leaves are used in Europe to flavor soups, stews, and sauces for meats. In England

and America its most general use is in mint sauce, the sauce *par excellence* with roast spring lamb. Mint jelly also is used similarly.

TANSY

Tansy (*Tanacetum vulgare* L.) is a perennial herb of the sunflower family (Compositae), native of Europe, which has spread over the civilized world as a weed. The odor of the plant is not very repulsive but its acid, bitter taste is not forgotten. A nibble of a single leaf is enough to last most people a lifetime. It is said a donkey will eat thistles but not tansy.

History.—The distilled water from the flowers and leaves of tansy was a common remedy in Europe during the sixteenth and seventeenth centuries.

Composition.—The characteristic volatile oil of tansy contains thujone, borneol, and camphor.

Use.—Tansy is used by some people to flavor puddings, omelettes, salads, stews, and other culinary dishes.

TARRAGON

Tarragon (*Artemisia Dracunculus* L.) is an herbaceous perennial plant of the sunflower family (Compositae), a native of Europe and perhaps southern Russia, Siberia, and Tartary. It has been cultivated for its leaves and tender shoots scarcely more than five hundred years. The popular name means "small dragon," because the root is coiled serpent-like.

Use.—The tender shoots and young leaves are often used in salads and for seasoning steaks and chops, especially by the French. The plant is frequently used as an ingredient in pickles, stews, soups, croquettes, and other meat preparations, and especially in fish sauces. Its most popular use is probably in vinegar. In France the famous French vinegar of Maille is made of this plant.

The volatile oil from the green parts of the plant is used to perfume toilet articles.

THYME

Thyme (*Thymus vulgaris* L.) is a diminutive perennial shrub, a native of dry stony places along the Mediterranean coast. It is a member of the mint family (Labiatae). It is now cultivated in most countries with a temperate climate, and grows abundantly in a wild state in the mountains of southern France. The small knotty and woody stems of thyme are found in clearings and on the shadeless coast districts of the Riviera, and also in the mountain regions of the Maritime Alps up to an altitude of 3,000 feet. Thyme has become naturalized as an escape from gardens in civilized countries, both warm and cold. The name "thyme" is derived from *thyō*, a Greek word for "sacrifice," and was so called because of its use as an incense to perfume the temples. The common thyme (*Thymus vulgaris* L.) should not be confused with wild thyme (*Thymus Serpyllum* L.), which is found abundantly on the moors and mountains of some parts of Great Britain, and the temperate parts of Europe, Asia, and northern Africa.

Composition.—These plants contain a volatile oil to which they owe their fragrance and aroma. The oil consists of pinene ($C_{10}H_{16}$), cymol or cymene ($C_{10}H_{14}$) and thymol ($C_{10}H_8O$). In the oil are found crystals of thymol, which resembles camphor, and because of its pleasant odor it is used as a disinfectant, where the strong-smelling carbolic acid would be objectionable.

History.—As has been stated above, thyme was popular with the Greeks as a temple incense. With the Romans it was used both in cookery and as bee forage. Although thyme has always been rather unimportant as a remedy, it and oil of thyme have been official since the sixteenth

century in most medicinal treatises and in drug and spice ordinances.

Use.—The green parts of the plant, either fresh or dried or in a decoction, are used extensively in soups, gravies, stews, sauces, forcemeats, sausages, and dressings. The fragrant oil contained in most of the plant is distilled chiefly in France for use in perfumery.

TONKA BEAN

The tonka bean (*Dipteryx odorata* Willd.), known as *cumarú* in South America, a member of the pea family (Leguminosae), is one of the most beautiful trees of northern South America. It grows as high as one hundred feet and may have a diameter of three feet. It is found in Venezuela, British Guiana, and the Amazon region. The kernels of the seeds are of considerable commercial importance in the manufacture of perfumes, which are quite fragrant, with the odor of new-mown hay. The odor closely suggests vanilla, and depends upon a crystalline substance, cumarin. Cumarin is cumaric anhydride ($C_6H_4.O.CO.CH:CH$). It is often seen on the surface of the beans as an efflorescence. This substance is widely distributed in nature. Of the plants in which it has been found the following may be mentioned: vanilla grass (*Anthoxanthum odoratum*); Carolina vanilla (*Trilisa odoratissima*) of the daisy family; yellow melilot (*Melilotus officinalis*) of the pea family. The tonka bean or its extract is used to flavor snuff, cigars, cigarettes, and sachet powders. It is employed as a substitute for vanilla in cocoa and confectionery.

TURMERIC

Turmeric (*Curcuma longa* L.) is a large-leaved herb closely related to ginger and of the same family (Zingiberaceae). It has been cultivated for a long time in India

and has a Sanskrit name. The source of the English word turmeric is unknown. No wild form of the plant has been found, but turmeric is considered as a probable native of Cochin China. Like ginger, the plant has an underground stem or rhizome which is thick and rounded, with short blunt finger-like tubers. It is these which constitute the spice, turmeric. The main portion of the rhizome is called long turmeric and the tuberous portion, round turmeric. Turmeric, like ginger, is grown from small pieces of the rootstock. By using this method of propagation there is not as much variation in the plant or its products as there would be if the plants were raised from seed. In commerce, however, turmeric is distinguished as from China, Madras, Bengal, and Cochin. Chinese turmeric is the most esteemed.

Composition.—Turmeric contains 1 per cent of a volatile oil which is made up of phellandrene and turmerol, and about one-third of 1 per cent of a yellow crystalline substance, curcumin, which is changed into vanillin by weak oxidation. Vanillin is the active principle of the vanilla bean and is closely related chemically to eugenol of clove oil. The coloring matter curcumin, which is yellow in acids and brownish-red in alkalies, is used in testing acidity.

History.—Apparently turmeric did not appear in western commerce as early as ginger. When it did appear it was not so important but was valued chiefly for its color. In the year A.D. 77 or 78 Dioscorides wrote of a kind of "cyperus" which resembled ginger but when chewed had a yellow color and bitter taste; doubtless this was turmeric. In 1280 Marco Polo mentioned it as occurring at Koncha (in the neighborhood of Fo-kien, China). In the Middle Ages it was generally known as Indian saffron and was imported by Arabs, Persians and Turks, who secured it from India.

Use.—Turmeric has a bright yellow color and a pleasant musky flavor. It is used locally in the East in curry. The fresh rootstocks are sold for this purpose and also to color various sweetmeats in Singapore and elsewhere. They have a use also as a dye for calico and paper in India. The East Indies and Europe likewise use turmeric as a dye, but because the color is faded by sunlight and alkali, it has been supplanted to a certain extent by more permanent aniline dyes.

VANILLA

The vanilla fruit is the product of a climbing orchid of the orchid family (Orchidaceae), a native of Mexico and Central America. Two species are cultivated or used in producing this spice: *Vanilla fragrans* (Salisb.) Ames, the true Mexican vanilla, with long, slender pods, and *Vanilla pompona* Schiede, the West Indian with short, thick pods. There are a few other species which have more or less fragrant pods, but none seem to have value as spices. The species most extensively cultivated is the Mexican vanilla, native from southeastern Mexico to Panama. This plant has been introduced and cultivated in many parts of the tropics and is grown extensively in the Seychelles, Reunion, Mauritius, Java, Tahiti, Fiji Islands, and West Indies.

The West Indian vanilla is apparently native from southern Mexico to Venezuela and Trinidad, and has been cultivated in Martinique and Guadeloupe. In the Malay Peninsula is another species, *Vanilla Griffithii*, which is commonly found wild. It, however, has none of the aromatic flavor or perfume of the American plant. In Mexico the flowers are fertilized naturally by bees and humming birds, but in other parts of the world it is necessary to fertilize the flowers by hand. The cultivation on a systematic basis in Java began in 1846.



VANILLA

History.—Vanilla was used by the Aztecs for flavoring chocolate before the discovery of America, and its use was adopted by the Spaniards. According to Morren, it was brought to Europe about 1510 and first described by Hernandez in 1651 in the *Rerum medicarum Novae Hispaniae thesaurus*.

Use.—Vanilla is used chiefly as a flavoring for chocolate, confectionery, and liquors, and formerly it was employed to a certain extent in medicines. The principal constituent of vanilla is vanillin. This was first investigated by Gobley in 1858. From 1874 to 1876 Tiemann and Haarmann worked on it and discovered that it could be produced artificially from coniferin, a glucoside found in the sapwood of certain pine trees. A number of other processes for the manufacture of vanillin have been devised since then. De Laire in 1891 started to work a process for forming it from eugenol, the substance to which oil of cloves owes its characteristic odor. This method was used commercially from 1891 to 1896 without causing any great change in the market price of natural vanilla, but the competition between European manufacturing firms resulted in the fall of the price of vanilla from \$45 per pound in 1890 to \$5 in 1903.

As vanillin was made from eugenol, the price of it depended on that of oil of cloves, from which the eugenol was obtained. In 1891, however, a patent was taken out for making vanillin electrolytically from sugar.

Although artificial vanillin is so much cheaper and can be put on the market at a figure so much lower, the cultivation of the real plant is by no means one of the past. The equivalent amount of artificial vanillin can be purchased for about one-thirtieth the cost of the natural product. Some buyers still prefer and are willing to pay a higher price for the natural product than for the artificial. The vanilla flavor (vanillin) is found also in other

plants: an orchid (*Selenipedium Chica*) of Panama; the fruit of the dog-rose (*Rosa canina*), a common rose of Europe and western Asia; the flowers of queen-of-the-meadow (*Filipendula Ulmaria* Maxim.), of Europe and Asia; the balsams and resins of Tolu (*Toluiifera*); the seeds of the white lupine of Europe (*Lupinus albus* L.); and in potato peelings.

ZEDOARY

Another spice of the ginger family (Zingiberaceae) known as zedoary consists of the rootstocks or rhizomes of *Curcuma Zedoaria*. This spice attained its greatest popularity in medieval times, but practically dropped out of commerce many years ago. In the East Indies, however, it still is cultivated. This is a handsome plant which resembles turmeric, but is larger. The rhizomes are of a light orange to orange color inside; the rootstocks are less brilliantly colored than turmeric and often are nearly white. The plant belongs to the same genus as turmeric but has much larger rhizomes, which are cut into transverse or longitudinal slices before drying.

History.—During the sixth and seventh centuries it is mentioned by Aetius, Paulus Aeginata, and other writers as coming from India, where it had been in use for a long time. In western Europe it became known toward the beginning of the eighth century.

Use.—The rootstocks of zedoary have a distinct aromatic taste which is not very strong and not at all pungent. Zedoary is used more as a drug than as a spice, even in the East. It is used also as a perfume, but on account of its musky odor it is not appreciated as an ingredient of curries.

In Field Museum an exhibit of spices and condiments is to be found in Hall 25 (Cases 38 and 40). Others may be seen in Hall 29 under the various plant families to which the spices and condiments belong; viz., vanilla (Case 804), ginger (Case 806), onion (Case 812), pepper (Case 819), nutmeg (Case 839), cinnamon (Case 839), tonka bean (Case 849), and clove (Case 858).

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